

WE CLAIM:

1. A method of reducing binding of a microorganism to a surface, comprising enzymatically modifying an adhesin on the microorganism.

2. The method of claim 1, wherein enzymatically modifying comprises contacting the microorganism with a polyphenol oxidase, an asparaginase, or a combination thereof.

3. The method of claim 1, wherein the microorganism comprises a prokaryote, a eukaryote, a virus, or a combination thereof.

4. The method of claim 3, wherein the prokaryote comprises a gram-positive bacterium, a gram-negative bacterium, or a combination thereof.

5. The method of claim 3, wherein the prokaryote comprises a *Staphylococcus*.

6. The method of claim 3, wherein the eukaryote comprises a fungus or protozoan.

7. The method of claim 6, wherein the fungus comprises a *Candida*.

8. The method of claim 1, wherein the adhesin comprises a lectin.

9. A method of reducing adhesion by a microorganism, comprising exposing the microorganism to an effective amount of an enzyme which reduces adhesion by a microorganism.

10. The method of claim 9, wherein the enzyme catalyzes a reaction for modifying a molecule on the microorganism.

11. The method of claim 9, wherein the enzyme catalyzes modification of a side chain of an amino acid.

5 12. The method of claim 11, wherein the amino acid is found in the binding site
an adhesin

13. The method of claim 11, wherein the amino acid comprises asparagine, tyrosine, or a combination thereof.

10 14. The method of claim 9, wherein the enzyme modifies a carbohydrate binding site on the microorganism.

15 15. The method of claim 12, wherein a lectin comprises the carbohydrate binding site.

16. The method of claim 9, wherein the enzyme comprises a polyphenol oxidase, an asparaginase, or a combination thereof.

20 17. The method of claim 9, wherein the microorganism comprises a prokaryote, a eukaryote, a virus, or a combination thereof.

25 18. The method of claim 17, wherein the prokaryote comprises a gram-positive bacterium, a gram-negative bacterium, or a combination thereof.

19. The method of claim 18, wherein the prokaryote comprises a *Staphylococcus*.

20. The method of claim 17, wherein the eukaryote comprises a fungus or protozoan.

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21. The method of claim 20, wherein the fungus comprises a *Candida*.

5 ~~22. A method of treating an animal, comprising administering to the animal an effective amount of an enzyme which reduces adhesion by a microorganism to the animal's cells or tissues.~~

23. The method of claim 22, wherein the enzyme comprises a polyphenol oxidase, an asparaginase, or a combination thereof.

10 24. The method of claim 22, wherein the microorganism comprises a prokaryote, a eukaryote, a virus, or a combination thereof.

15 25. The method of claim 24, wherein the prokaryote comprises a gram-positive bacterium, a gram-negative bacterium, or a combination thereof.

26. The method of claim 24, wherein the prokaryote comprises a *Staphylococcus*.

20 27. The method of claim 24, wherein the eukaryote comprises a fungus or a protozoan.

28. The method of claim 27, wherein the fungus comprises a *Candida*.

25 29. The method of claim 22, wherein administering the enzyme comprises oral or topical administration.

30 30. The method of claim 29, wherein administering the enzyme comprises topical administration to a nasal tissue.

31. The method of claim 29, wherein administering the enzyme comprises oral administration to a digestive tissue.

32. The method of claim 31, wherein the oral administration to the digestive tissue comprises administering a sustained release formulation or an enteric formulation.

5 — 33. An oral care composition comprising an effective amount of an enzyme which reduces adhesion by a microorganism.

34. The oral care composition of claim 33, wherein the enzyme comprises a polyphenol oxidase, an asparaginase, or a combination thereof.

10 35. The oral care composition of claim 33, wherein the microorganism comprises a prokaryote, a eukaryote, a virus, or a combination thereof.

15 36. The oral care composition of claim 35, wherein the prokaryote comprises a gram-positive bacterium, a gram-negative bacterium, a protozoan, or a combination thereof.

37. The oral care composition of claim 35, wherein the prokaryote comprises a *Staphylococcus*.

20 38. The oral care composition of claim 35, wherein the eukaryote comprises a fungus or protozoan.

39. The oral care composition of claim 33, further comprising a buffer, a peroxide, a source of copper ion, an oxygen generating compound, or a combination thereof.

25 40. The oral care composition of claim 33, wherein the oral care composition comprises a mouthwash, a toothpaste, an implant, or a combination thereof.

30 41. The oral care composition of claim 33, wherein the oral care composition comprises a solid, a semi-solid, or a liquid composition.

42. A method for reducing adhesion by a microorganism to oral tissues or cells, comprising exposing the oral tissues or cells to an oral care composition comprising an effective amount of an enzyme which reduces adhesion by a microorganism.

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43. The method of claim 42, wherein the oral care composition comprises a mouthwash, a toothpaste, an implant, or a combination thereof.

44. A method for reducing adhesion by a microorganism to a dental prosthesis, comprising exposing the dental prosthesis to an oral care composition comprising an effective amount of an enzyme which reduces adhesion by a microorganism.

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45. The method of claim 44, wherein the dental prosthesis comprises a denture.

46. A method of making an oral composition useful for reducing adhesion by a microorganism, comprising the step of adding to an oral composition an effective amount of an enzyme which reduces adhesion by a microorganism.

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47. A pharmaceutical composition comprising an effective amount of polyphenol oxidase which reduces adhesion by a microorganism and a pharmaceutically acceptable carrier.

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48. The pharmaceutical composition of claim 47, wherein the polyphenol oxidase comprises polyphenol oxidase isolated from a microorganism or plant.

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49. The pharmaceutical composition of claim 47, wherein the microorganism or plant comprises a thermophilic microorganism, a thermophilic fungus, or a mushroom.

50. The pharmaceutical composition of claim 47, wherein the polyphenol oxidase comprises recombinant polyphenol oxidase.

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